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Effective Coordination of Vertical IS Standardisation Initiatives

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Abstract

This paper investigates vertical IS standardisation initiatives from an Actor Network Theory (ANT) perspective. It describes the standardisation process as a series of translations of interests. The ANT lens provides an insight into how participating organisations attempt to align the interests of other organisations. The contributions of this paper are: (i) a deeper understanding of the vertical IS standardisation process; (ii) actions participating organisations can take to effectively coordinate vertical IS standardisation initiatives.

Keywords

Vertical IS Standards, Industry-wide Collaborations, Actor Network Theory, Translation

INTRODUCTION

The proliferation of internet technologies such as eXtensible Markup Language (XML), Simple Object Access Protocol (SOAP), and Web Services Definition Language (WDSL) has encouraged many user organisations to start their own standardisation initiatives but a good number of these initiatives have collapsed or have become dormant in the last couple of years. BizDex, XML/EDI, Convisint and eCheck & Financial Markup Language are some of the high profile standardisation initiatives that were reported having questionable performance in both academic journals and popular press (Gerst, Bunduchi & Williams 2005; Gogan 2005). Failures of these standardisation initiatives have far-reaching consequences. The failures can result in huge financial and operational costs for participating organisations. In addition, a lack of standards at the industry level hinder business organisations from exploiting the true potential of eBusiness (Choi, Raghu & Vinze 2004; Reimers & Li 2005; Wigand, Steinfield & Markus 2005; Xia, Zhao & Shaw 2003; Zhao, Xia & Shaw 2005).

In this paper we consider standardisation initiatives organised for the development of Information Systems standards (IS). IS standards are standardised business documents, data definitions and business processes (Steinfield et al. 2004). The main purpose of IS standards is to facilitate the seamless exchange of data and information between trading partners (Kotinurmi 2007; Nurmilaakso, Kotinurmi & Laesvuori 2006; Reimers & Li 2005). As Markus, Steinfield and Wigand put it "Because [IS] standards concerns not so much IT but how IT is used, we refer to them as …Information Systems (IS) standards" (2003, p. 81). These standards are essentially public goods. That is once an IS standard is created, any organisation is free to adopt it, regardless whether they contributed to the development of the standard or not (Kindleberger 1983). The focus of this paper is on Vertical IS (VIS) Standards; 'vertical' denotes IS standards that are specific to one particular industry (Markus et al. 2003; Markus et al. 2006; Nelson, Shaw & Qualls 2005; Steinfield et al. 2004).

The study of VIS Standardisation (VISS) initiatives is an emerging field with very little empirical evidence. Prior studies have conceptualised the VISS process as a process of creating public goods (Markus et al. 2006), a process of negotiations and a process needing institutional rules (Steinfield et al. 2004). Seminal authors in the field have urged others to investigate VISS initiatives from different perspectives questioning the assumption of various theories used so far (see Markus et al. 2006). Research into management of standardisation initiatives is required because of the high rate of unsatisfactory outcomes (Cameron 2007). We also need to investigate how information infrastructure such as VIS standards can become possible through industry-wide collaborations before analysing how individuals and organisations can adopt eBusiness. For the preceding reasons, the IS community and practitioners are alike need a deeper understanding of VISS initiatives.

The research questions in this paper are:

1 What *argument* and *inducements* do organisations use to persuade other organisations to participate in VISS initiatives?
2 How do participants *negotiate* the *diverse interests* of the participating organisations in standards development activities?
3 How do VISS initiatives *promote the adoption* of VIS standards?

The paper is structured as follows. The next section discusses the nature and challenges of coordinating VISS initiatives and the conceptual lens used in the research. Section 3 provides details of the research methodology and section 4 presents the cross case study findings. The last section discusses various coordination mechanisms to effectively manage VISS initiatives and concludes the paper.

VISS INITIATIVES

The challenge of standardisation is such that one single organisation is not capable or willing to undertake such a costly, risky and protracted exercise on their own. Thus, a more collaborative approach is needed. However, encouraging organisations to participate and to contribute resources to industry-wide collaboration is difficult. The main problems arise from the fact that VIS standards are public goods and user organisations can 'free ride' without contributing resources to the development of the standards. Many recent studies have acknowledged the difficulties and have explored various mechanisms to address the problems with particular emphasis on understanding how economic incentives (direct or indirect) can be provided to encourage participation (Markus et al. 2006; Nelson, Shaw & Qualls 2005; Wigand, Steinfield & Markus 2005; Zhao & Xia 2006).

A focus on economic incentives has led to a game theory view of the problem where multiple players make decisions in an attempt to maximise their returns. For example, Zhao and Xia (2006) found that Information Technology (IT) vendors and user organisations contributed different levels of resources to VIS standardisation initiatives. They pointed out that user organisations (main beneficiaries of standardisation) realise their benefits from increased interoperability with their trading partners, whereas, IT vendors only benefit from standards if user organisations buy the standards compliant software or commission IT vendors to incorporate standards into the existing inter-organisational systems. Much previous research relied on Olson's (1965) argument about collective action yielding disproportionate benefits to the participants and they therefore conclude that IT vendors should be given more benefits than user organisations to encourage them to participate in VIS standardisation initiatives. In another example, Markus et al. (2006), on the basis of the high cost of participating in standardisation initiatives, advocates an equitable Intellectual Property Rights agreement (IPR). Markus et al. (2006) argue that an IPR should be equitable so that actors who might otherwise lose from standardisation gain the ability to benefit commercially and, at the same time, that no one group (especially IT vendors or service provider) is able to extract monopoly profit from standardisation. In addition to compensating the losses, Markus et al. (2006) goes on to suggest using 'Moral suasion' to convince the key players[1] in the market to do the right thing for the industry and to point out the consequence of not doing the right thing such as bad publicity.

The fact that participation in VISS initiatives is usually voluntary also has an effect on the resources available for the initiative. Participants' contributing resources affects the success of failure of VISS initiative (Steinfield et al. 2004). Zhao et al (2005) using, Olson's assertions about collective actions, argue that the level of organisations' resource contributions to VISS initiatives is contingent upon participating organisations' resources capability as well as the level of insider benefits they could derive from participating in VISS initiative. They hypothesise that how well the VISS initiative manages their resources, and the prevailing level of uncertainty in the industry, have an effect on the level of contributions to VISS initiatives.

The optional or volunteer nature of collaboration also has an effect on the *legitimacy* of the VISS initiative. The main issue here is not the loss of resource contribution but the emergence of rival standardisation initiatives formed by detractors (Gerst & Bunduchi 2005; Gerst, Bunduchi & Williams 2005; Greenstien 1992; Markus et al. 2006). More specifically, if the interests of the participating organisations do not align then any dissatisfied participating organisations can launch a rival standardisation initiative to achieve their goals (Gerst et al. 2005; Greenstien 1992; Markus et al. 2006). Thus it is possible for two or more VISS initiatives to exist in one industry (Gerst et al. 2005). VISS initiatives do not have the same legitimate mandate to develop and force implementation of standards like formal SDO or regulatory bodies. Without legitimacy, rival standardisation initiatives will compete for the larger market share to become a de facto standard (Greenstien 1992). Therefore,

[1] In MISMO initiatives, the government sponsored enterprises were the key player in the US Home Mortgage Market – Freddie Mac and Fannie Mae. They provided IT services to the US Mortgage industry.

not only do organisations need encouragements to participate in VISS initiatives but they also have to be retained and kept involved if the collaboration is to be successful.

VIS standards development can also be problematic because of the complexity of the standards development process (Nelson, Shaw & Qualls 2005). A considerable body of literature focuses on identifying the consequences of non-resolution of the complexities of standards development (Chang & Jarvenpaa 2005; Choi, Raghu & Vinze 2004; Gerst & Bunduchi 2005; Williams et al. 2004; Zhao, Xia & Shaw 2005). For example Gogan (2005), analysing the Financial Services Markup Language (FSML) standards project found that the design team made some reasonable technical decisions at various stages, but in aggregate the decisions they took channelled the development team on a technical path, which they chose not to abandon. Consequently, the project failed to materialise. Gogan (2005) argues that the decisions made early in a standards development process may force the standards on a path that might yield undesirable outcomes.

The heterogeneous interests of the participating organisations also create tensions in VISS initiatives, and compromise is invariably necessary. For example, Markus et al. (2006) found that regardless of their best attempts, the developers had to make compromises on the quality of the standards to reconcile the heterogeneous interests. The rationale for such a compromise is that promoting standards diffusions of a simple standard is better than designing a [technically] perfect standard that does not diffuse widely. Another way is to take action to reduce political manoeuvring early. Steinfield et al. (2004) and Markus et al. (2006) suggest an explicit governance mechanism is an effective tool in managing potential tensions in standards development work. Furthermore, taking scoping decisions early can also reduce the room for political manoeuvring. For example, Steinfield et al. (2004) found the US home mortgage standardisation initiative - MISMO deliberately avoided developing standards with a broader scope, as they put it 'everything and the kitchen sink'[2], to avoid potential tensions. They also argue that standards that require organisations to change their internal process are likely to create tensions.

So far we have discussed the *development* of VIS. The *diffusion* of standards is also problematic. This is primarily because VISS initiatives do not have the power to force the implementation of standards. The existing literature focuses on the either the impediments of standards implementations - lack of resources and technical expertise (Chang & Jarvenpaa 2005; Gerst & Bunduchi 2005; Gerst et al. 2005) - or on how technologies pass through time and space (Markus et al. 2006; Nelson, Shaw & Qualls 2005). Markus et al. (2006) argue that standards are only useful when the diffusion rate reaches a critical mass but that the uncertainty about the cost and benefits as well as the risk of standards implementation may cause each participating organisation to wait until others adopt the new technology. They relate this dilemma to the 'penguin effect'. That is, "penguins who must enter the water to find food often delay doing so because they fear the presence of predators. Each would prefer some other penguin to test the water first" (Farrell & Saloner 1986, p. 943). The main implication is that the adoption of standards is delayed until someone else takes the risk of implementing the unknown.

Preceding discussions suggests that VISS initiatives comprise three distinct negotiations that take place in three different socio-technical environments. The first negotiation is to 'structure the collaboration' to develop and implement vertical IS standards. This negotiation takes place between organisations at the industry level. Here the participating organisations negotiate the institutional structures and the rules of the collaboration. However, the negotiation is not easy because it is particularly challenging to encourage participation and to encourage contribution of resources when the participation is voluntary. This negotiation presents two dilemmas for potential participants. The first is whether to collaborate or not to collaborate with other organisation to develop standards. The second is to whether to participate in standards development or take a free ride and adopt standards once they are developed. The second negotiation is to 'develop standards' specification. This negotiation takes place between participant organisations in working groups. The members of the working groups need to achieve consensus to develop standards. However, the heterogeneity of the participants make achieving consensus difficult. The different structural type such as suppliers, retailers, and logistic operators and different sizes of same structural types also create tensions, which hampers the standards development activities. This negotiation process also has dilemmas for standards developers. The first is whether to commit more resources to develop comprehensive or more standards or to commit resources to promote the adoption of standards. The third negotiation is to 'promote adoption of standards'. This negotiation takes place between standardisation initiative and the organisations in the industry. Factors such as lack of resources and lack of technical expertise hamper the implementation of standards in the user organisations. The main challenge of the implementation process is also suggest a dilemma for user organisation. That is whether to take risk of being first to implement the standards that have not been proven to work yet.

[2] The common phrase is 'everything but the kitchen sink' has been modified by Steinfield.

We argue that this tri-part negotiation framework (structuring the collaboration; developing standards; promoting the adoption of standards) is a useful way of analysing VISS initiatives.

ACTOR NETWORK THEORY (ANT) AS A CONCEPTUAL LENS

Actor Network Theory (ANT) can be described as a radical post-modern sociological theory[3]. It is radical because it asks us not to subscribe to the [symbolic] boundaries such as social/technical, macro/micro and human/non-human, which we have been acclimatized for many centuries as an essential view of the world (Latour 1999). ANT theorists argue that society is full of actors pursuing various interests and these actors may experience some difficulties achieving their goals. When they come across hurdles, they can either give up or find an alternative way to achieve their goals. In general actors who cannot achieve their goals on their own may need to find someone who can assist them (Latour 2004). ANT theorists suggest that we should follow the journey of actors, mapping their actions and strategies as they create an actor-network of aligned interests. Therefore, a core focus of ANT is on how actor-networks are created and how they achieve stability.

This research draws on the works of Michel Callon (1986) on moments of translation and Bruno Latour's (1987) translation strategies to examine VISS standardisation initiatives. Translation refers to the way actor-networks are formed (Callon 1986; Latour 1987). Callon and Latour (1981, p. 279) describes translations as " …all the negotiation, intrigues, calculations, acts of persuasion and violence thanks to which an actor or force takes, or causes to be conferred to itself, authority to speak or act on behalf of another actor or force." The ANT concepts used in this paper are summarised in the table below.

Table 1. A Summary of ANT Concepts

ANT Concepts	Description
Actors	Actors are essentially 'entities that do things', which encompass all elements, human and non-human factors[4]. An actor in ANT is described by their relationship to other actors and humans are defined through their use of artefacts (Latour 1999).
Actor-networks	A heterogeneous network constituting human and non-human elements (Callon 1986).
Translation	Actor-networks do not exist; they are enacted. Translation refers to the way this actor-network is formed (Callon & Latour 1981).
Problematisation Process	The initial stage of building an Actor-network. A focal actor re(defines) a problem and presents themselves as the solution (Callon 1986; Czarniawska-Joerges 1998).
Interessement Process	Interessement encompasses a variety of strategies and mechanisms by which the focal actor attempts to enrol other entities in their actor-network (Callon 1986; 1991).
Enrolment Process	Enrolment is the moment when another actor accept the interests defined by the focal actor. Enrolment also includes the definition of roles of each actor in the newly created actor-network (Callon 1986; Czarniawska-Jorges 1998; Holstrom & Robey 2005).
Mobilisation Process	The final moment of the translation process is when the actor-network achieves stabilisation. Stability means that the actor-network starts to speak as one (Callon 1986).

[3] There is a debate whether ANT is a theory, a framework, or a useful position in sociology (Walsham & Sahay 1999; Howcroft et al. 2004). This paper uses it as a framework to analyse empirical data.

[4] Treatment of Human and non-Human actors is a contentious issue. There is a completely separate debate on the matter. This concept relevant to IS as it could be considered as bringing the materiality into the limelight that has been missing from some of the social theories adopted in information systems (Howcroft et al. 2004). Many researchers such as Orlikowski and Iacono (2001) argue a similar line asking where has IT gone in IS research?

The review of literature suggests that the VISS process has three distinct phases each of which can be understood using ANT as a conceptual lens:

i. Structuring the collaboration. This translation process starts when a focal actor comes up with an idea to develop standards. Actors who pursue their goals usually need help from others to achieve their goals. Thus the core focus of this phase is on how these focal actors convince other actors to collaborate. In other words, what type of translation strategies would they use and how effective would they be in convincing others to join the standardisation initiative? If focal actors are successful in enrolling other actors, then the idea is institutionalised creating an aggregated actor or an actor-network with procedures for running a standards development consortium. Therefore, the actor-network is created through negotiations between actors who agree to become associated with one another and express their wishes through a common spokesperson.

ii. Developing standards specifications. The translation process to develop standards specifications starts when an actor sets up a working group. The standards development phase is a recursive process of negotiations between various actors in the working group and with the technology used to create standards specifications. Actors have diverse interests. Therefore, the stability of the actor-network rests largely on the capability to translate the diverse interests. In other words, the interests of all actors, both human and non-human, need to be aligned in order to achieve stabilisation. The actor-network approach cannot beforehand identify which actor gains most from co-enrolment but it is clear that contradictions arise in the pursuit of common means to different goals. The core focus of this phase is on how various actors negotiate or achieve consensus on developing standards. That is, the focus is on how the competing interests of actors are aligned to achieve stability. During this translation the standards specification are black boxed. Furthermore, by following the actors we can establish how their interests are inscribed in standards specifications and the relative strength of the inscription in terms of its durability and mobility.

iii. Promoting adoption standards. The translation process for this phase begins when the focal actors attempt to promote the adoption and implementation of standards. Development does not necessarily lead to automatic implementation by the organisations in the industry. That is, the inscribed pattern of use envisioned by the designers may not eventuate because some standards are less innovative and some tend to be highly complex. In addition, general impediments such as high costs of implementation and a lack of technical expertise to implement standards also hamper adoption of standards. We can establish how a focal actor entices others to implement standards by following their actions. That can be completed by tracing how a focal actor eliminates barriers or provides incentives to implement standards.

METHODOLOGY

We used a multiple case study design with replication logic. We selected two cases of active Australian standardisation initiatives: Applie-Com and LIXI. Applie-Com was an initiative to develop vertical IS standards to facilitate exchange of business information between suppliers and retailers in the Appliance industry. A unique feature of this industry is that appliance products are mostly commoditised. Also, standardisation in the industry is made complex by the fact that most retailers carry products other than appliance products in their stores. LIXI was an initiative to develop vertical IS standards to facilitate exchange of business information between multiple business partners in the Mortgage industry. The industry involves many players, with a typical transaction including up to eight different types of business organisations (brokers, lenders, valuer, mortgage insurance …etc). Lending organisations play a pivotal role in the lending chain.

The research employed multiple data collection procedures. All data was collected in a three year period (2005 – 2008). The primary source of data was semi-structured interviews. We interviewed six members from each of the two standardisation initiatives. A typical interview lasted about an hour but some interviews went over two hours. Questions were modified over time to probe into issues identified by earlier interviews. We also collected relevant documents in the public domain such as announcements on the consortia web sites, news paper articles and trade journals. We also regularly attended annual general meetings and trade exhibitions and made extensive notes on speeches and presentations. The documents and notes assisted in triangulating the collected data and increased the internal validity of the findings. The external validity of the findings was achieved through providing rich, thick description (Merriam 1998) of the findings and through using some interviewees as a check throughout the project.

We used ‘meaning interpretation’ (Kvale 1996) to analyse the collected data. We also used a conceptual framework based on ANT concepts; the main idea of the analysis was to discover and understand the data in terms of translations. We identified and followed focal actors, irrespective of their materiality, building actor-networks to pursue their goals, and constructed two narratives describing the translations taking place. These

narratives are presented in the following two sections. Finally we performed a cross-case analysis to identify the dominant themes – this analysis is presented in the discussion section below.

APPLIE-COM STANDARDISATION INITIATIVE

Prior to the Applie-Com standardisation initiative, the Australian Appliance industry had been slow to adopt eBusiness technologies (Szabo J. [GS1] 2007, pers. comm., 5th September). Most organisations in the Appliance industry used IT for internal efficiencies but they had not explored innovations such as inter-organisational systems that span organisational boundaries. The majority of the applications were proprietary solutions of (large) trading partners.

Bilateral systems are inefficient when there are multiple trading partners because companies in the supply chain have to use different systems to interact with their business partners. Human involvement, needed to re-enter data from one system to another, causes additional complications. In the Appliance industry prior to Applie-Com, 15-20 per cent of sales administration time had been devoted to fixing errors with associated costs being as much as a half a per cent of the total revenue. These inefficiencies caused errors and delays, costing the entire industry millions of dollars.

In 2000 a group of senior executives in the industry attended an overseas trade conference. This group included representatives from six large suppliers and five retailers in the industry. During the conference, the executives discussed the inefficiencies in supply chain of the appliance industry in Australia. Subsequently these initiators (focal actors) decided to work together to achieve 'excellence through unity' and they formed an informal group to explore the possibility of setting up vertical IS standards that would facilitate business-to-business eCommerce within the industry.

Arguing that standards would address a very clear business problem – inefficiencies in the Appliance supply chain - the focal actors gained sufficient support to launch a standardisation initiative. They argued that organisations in the industry could not only save millions of dollars through implementing standards but the initiative would also lead to the creation of an industry association to represent their collective industry to the outside world. The focal actors also provided an incentive to induce other organisations to join the standardisation initiative. The incentive came in the form of a low resource commitment (minimum cost) to join the standardisation initiative. While both these strategies helped in setting up the standardisation initiative, another force assisted the focal actors' efforts: the high level of product commoditisation. Being highly commoditised meant that the Appliance industry was very conducive for collaborative work.

Applie-Com used various mechanisms to hold and bind the actors to the standardisation initiative. First, the focal actors enlisted a standards development organisation as a strategic partner. Second, they sought and obtained approval from a regulator. Third, they sought funding from a government agency. These mechanisms not only provided expertise and resources, they legitimised the efforts of the focal actors.

Faced with diverse interests of actors, the Applie-com working groups created to develop the standards faced various challenges. For example, various actors took the opportunity to push for their explicit interests in the Technology Working Group in Applie-Com. This created tension between a number of actors. In the end, the successful actors were the ones who managed to align the interest of other actors to their goals and the ones who managed to obtain the support of powerful actors. Out of many options (Automatic Data Capture Technologies; Data Synchronisation Platforms; Web Portals; Electronic Messaging – XML & EDI), the working group developed 24 message guidelines from a suite of 220 UN/EDIFACT.

Applie-Com did not desire to own any Intellectual property (IP) rights as an outcome of this initiative, but may have considered this if it warranted further action. The Applie-Com consortium adopted a neutral position in order to reduce any liabilities. The Applie-Com group was strongly in the view that irrespective of the direction that the group takes, the members needed to conduct their own 'due diligence' and 'commercial assessment' of any decision they take following Applie-Com's guidelines.

The focal actors of Applie-com reduced the cost of implementing standards by developing a web-based message testing and validation tool. They also organised series of events such as seminars, road shows and forums for the members to demonstrate the implementation process. The purpose of these tactics was to reduce the time and cost of implementing standards and, more importantly, to alleviate concerns of user organisations about the any economic and technical consequences. However, progress in implementation was not clearly visible. During this time, the convenor of the Applie-com retired from the position and the whole initiative became dormant.

LIXI STANDARDISATION INITIATIVE

Prior to the LIXI standardisation initiative, most of the operations in the Mortgage Lending industry were paper-based and essentially everybody in the Mortgage Lending industry had proprietary systems. There was only limited capacity to communicate electronically and the existing systems were largely bilateral systems, making use of 'adapters' to convert between the systems (Duerden 2006). Almost all loan submissions from the brokers were paper-based and each lending organisation used a completely different loan application. The data requirements of the lending organisations also differed significantly. The Australian Mortgage Lending industry took on average 38 days to settle a purchase of a home, which was three times that of the USA and approximately double the time in the UK.

During the property market boom in early 2000, most lending organisations struggled to cope with the increased level of mortgage loan applications. This put significant pressure on their level of service. The multiple loan origination channels (broker channels and the branches) added more pressure on lending organisations. Some lending organisations were working on solutions to solve their problems. For example, one group invested more in the workforce at the data entry phase because everything was paper-based and manual[5]. Another group looked into technology solutions and wanted to develop a system to accept loan applications electronically.

At the other end of the Mortgage Lending chain, brokers experienced similar problems with mortgage loan applications. They manually filled in almost all mortgage loan applications. They had the added inconvenience of working with multiple loan application formats from different lending organisations (Duerden 2006). The situation for brokers was somewhat different to what lending organisations were facing. The broker's primary concern is to get a conditional approval as soon as possible. Brokers in general wanted to excel in servicing their client base but how they submitted loans application to the lending organisation hampered their efforts to provide a quick conditional approval. The brokers faced further problems: the administration and calculation of their commission payments was done manually, and in general lending organisations provide upfront and trail commissions in different formats, and some lending organisations provided the information in paper form (Duerden 2006).

In 2000 two software vendors in the Mortgage Lending Industry (focal actors) presented a proposal to standardise. Their strategy was to state a hypothetical assertion about a worst-case scenario for the business organisations in the Mortgage Lending industry: that if the industry did not change the way they operated, the new international lending organisations with superior technological capabilities, good customer service attitudes and lower cost base would make the traditional lending organisations obsolete. However, this value proposition was not sufficient to overcome the collective mindset of the lending community that any standardisation erodes competitive advantage. Thus the focal actors initially failed to enlist the support of the business organisations in the Mortgage Lending industry. The focal actors then targeted the established institutions (the major lending organisations) in the industry and succeeded in getting their support for the standardisation initiative. Many other organisations in the Mortgage Lending industry followed the leaders and joined the initiative. The focal actors also provided incentives to organisations: they offered an associate membership category that would entitle the holder to participate in the standardisation initiative but not to have the right to use the standards.

The heterogeneity of interests of the actors created many tensions in standards development work. To resolve tensions, the actors agreed on a permissive approach to standards development whereby they focused on developing the core details and included all other extra details as optional elements in the standards specification. This was possible because the chosen platform (XML) allowed the designers to define optional elements in the standards specification. This permissive approach created problems later on, but in the early days of the development it reduced tensions in the working groups. Another strategy was to provide an opportunity for actors to express their views, difficulties and aspirations without being constrained outside the working groups. Such a tactic accelerated standards development because it leads to less tense negotiations of minor matters of misunderstanding in working groups.

Actors restricted the scope of the standards to ensure the outcome of the process did not change the competitive position of the participants. In addition, the program of actions instilled in the policies and procedures also assisted in reducing tensions. The working group policy stipulated that actors must define the problem they are trying to solve through standards before setting up a working group. These policies essentially reduced the room for political manoeuvring in the working groups.

The investigation revealed many issues at the implementation/adoption phase. For example, some user groups, especially SMEs, did not have the necessary knowledge or expertise to implement standards. To address this,

[5] Some argued that it is a necessary evil as manual processing provide a much needed quality control and most lenders have outsourced the data entry so it seemed the oblivious solution

the standards consortium developed a reference implementation model (a prototype) to assist user organisations implement standards. An effective mechanism was to continue the collaboration used in the development phase into the implementation phase, with user groups continuing to collaborate and develop systems that could be used by all users. The focal actors also realised that without access to resources, standards do not get implemented in user organisations, so they needed to target the real decision-makers in user organisations.

DISCUSSION

A significant contribution of this study to the area of VISS initiatives comes from identifying effective inducements and arguments that can be used to persuade organisations to participate in standardisation initiatives. The cross case study analysis showed that initiators have to provide not only an attractive value proposition but also a persuasive explanation as to why standardisation is necessary for the industry in order to induce user organisations to abandon their pursuit of proprietary bilateral solutions. The strength of the initiators' explanation depends on whether it relates to a recognisable business problem for user organisations. In addition, negative tactics such as coercion are not as effective as positive inducements. Coercion techniques such those suggested by Markus et al. (2006) and ones used by the LIXI initiators are not likely to succeed.

Another important mechanism that can help convince organisations to participate in standardisation initiatives is to first enlist the support of key organisations in the industry. In uncertain environments, such as industry-wide collaborations, there is a tendency to follow industry leaders.

An important contribution of the study comes from identifying mechanisms that initiators can use to minimise the possibility of rifts. Legitimisation is important in this regard. To legitimise a VISS initiative, initiators can enlist particular actors who can provide legitimacy. Government agencies, industry associations and university based research institutions are credible actors that can provide such legitimacy. Involving an existing formal SDO would also further enhance the legitimacy of a VISS initiative. Industry leaders can also provide legitimacy.

The institutional structures of both standardisation initiatives we studied were mainly developed in response to local contingencies rather than mimicking other successful standardisation initiatives. That is, elements of various institutional structures were adopted to handle local problems. The significant issue here is not the influence of 'isomorphism' rather the effectiveness of the policies and procedures in managing industry-wide collaborations that resides in between hierarchical form of organisations and markets. Both standardisation initiatives we studied used a flexible non-explicit approach to manage the standardisation initiative. They had explicit policies (such as 'due diligence' and 'commercial assessment') that would minimise their liability but most other policies and procedures were not specific. We therefore have evidence that policies and procedures developed as a response to a local problem can be just as effective as the policies and procedures specified as norms of standardisation.

This research found that promoting social interaction outside the working group would greatly reduce tensions within the working group. Standards development is a tedious, boring and protracted exercise. In such instances, the opportunity to express views, difficulties and aspirations without being constrained, would reduce misunderstandings about motives and the behaviour of other participants. Fewer tensions in the working groups occur when participant exchange views on matters relevant to them in other forums (i.e. outside working groups). This accelerates the standards development process because it leads to less tense negotiations over minor matters or misunderstandings. Such a strategy would facilitate well-structured standards specifications.

We found that practical assistance at the implementation stage aids adoption and implementation. The practical assistance could comprise prototypes, testing and validation tools. The use of such assistance helps to eliminate the perception that there is no incentive for anyone to implement standards. In addition, promoting collaboration beyond standards development can also work as an effective implementation strategy. That is encouraging user groups to pool resources and collaboratively develop a solution they all can implement.

The research findings described above should be considered carefully in the context of the chosen research method: there are some limitations. First, this research investigated standardisation only from the perspective of the participants. Thus, the findings of this research is confined to the experiences and understanding of the participants of the standardisation initiatives. Second, both researcher and the interviewees introduced bias into the story. The personal interaction between the researcher and the interview subjects may have an impact on the results. However, these limitations do not affect accurate portrayal of the two standardisation initiatives rather they provide a platform for future research.

CONCLUSION

The effective coordination of VISS initiatives is a difficult task: the players must cooperate in a situation where free-riding is a distinct possibility: cooperation among participants cannot be secured through market and hierarchical forms of control. Effective coordination therefore depends on the relationships among the participating organisation, which are negotiated on an ongoing basis through all phases of the process. Consequently, standardisation represents a complex set of ongoing negotiations to align interests among the organisations participating in the collaboration. Successful negotiations lead to positive inducements of participants, legitimising the VISS initiative, development well structured VIS standards and successful diffusion of VIS standards.

This paper provides an understanding of how organisations can effectively coordinate VISS initiatives. It offers several contributions to knowledge, in areas of theory and practice. This paper contributes to the theory of Technology Standardisation by explaining how VIS standards are developed and how standards adoption is promoted. VISS initiatives are essentially inter-organisational collaborations to create a public good. This paper also contributes to the domain of organisational theory by identifying mechanisms that organisations can employ to achieve successful collaborations of this nature and how participating organisations negotiate the institutional environment of the collaboration. Finally, this paper outlined several various mechanisms and strategies practitioners can use to coordinate VISS initiatives effectively.

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